

INTESTINAL OBSTRUCTION  
-  
A REVIEW OF SIX FATAL CASES.

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Hugh Dudley,



CASES I and II

ACUTE STRANGULATING SMALL BOWEL OBSTRUCTION.

" This minute I was well, and am ill, this minute."

- John Donne.

## CASE I.

MACK, MRS. PHYLLIS.  
Carnettie Street,  
Rosewell.

Age 76.  
Retired.

Admitted 30.i.46.  
Died 2.ii.46.

### HISTORY.

This old lady was quite well until one week before admission. At this time there was a sudden onset of severe colicky abdominal pain, localised at the umbilicus and lasting intermittently for approximately an hour. She was thought - as vomiting followed - to be suffering from an acute gastritis following the eating of a pie which might possibly have disagreed with her and treatment was accordingly confined to rest in bed, local heat to the abdomen and sedatives. These measures did not produce notable relief, the pain and vomiting continuing off and on throughout the day; the vomitus soon became green in colour. At no time did she have any suggestion of rigor or fever.

On the following day the pain and vomiting were less severe but she felt weakened by the upset she was undergoing. An enema given at this time produced a small faecal result and a little flatus.

During the next few days her condition remained unchanged with continued pain of a colicky nature and occasional vomiting of dark material. An enema was given daily, producing small faecal and flatus results.

Twelve hours before admission the attacks of colic became more frequent and again more severe. Frequent "violent" vomiting coincided with this, such a state continuing up to the time of her admission.

She gave no relevant past history in any way apart from exertional dyspnoea compatible with her age.

### EXAMINATION.

She was a small thin old woman, pale, wasted and obviously dehydrated and exhausted. Her mental

clarity was somewhat surprising.

In addition to the superficial evidence of dehydration - dry skin, sunken eyes and decreased intra-ocular tension - her tongue was furred and dry.

**ABDOMEN.** Under a dry and blistered skin this could be seen to be moving freely on respiration but there was a degree of fullness, evenly distributed, inconsistent with her age and bodily figure. There was practically no sub-cutaneous fat; ladder patterns, suggestive of small bowel peristalsis, could be seen passing obliquely across the abdominal wall but the movements were very infrequent. There was no rigidity or guarding of the anterior abdominal muscles but on deep palpation poorly localised tenderness could be detected.

A small amount of free fluid could be demonstrated by shifting dulness. Examination of the liver, spleen and hernial orifices revealed nothing of note but auscultation showed infrequent intestinal sounds of a metallic character.

**RECTAL EXAMINATION** revealed a few faeces in the rectum and the skin tags of old piles. Otherwise there was nothing to note.

**RESPIRATORY SYSTEM.** Her chest had the poor expansion of the aged and there were basal crepitations in both lung fields. There was no evidence of consolidation.

**CARDIO-VASCULAR SYSTEM.** The pulse was rapid, regular in time and force but of poor volume and tension; in spite of this her blood pressure was found to be 140/55 mms. of mercury. All the valvular sounds were closed.

**BLOOD.** The haemoglobin was 75%

#### DIAGNOSIS.

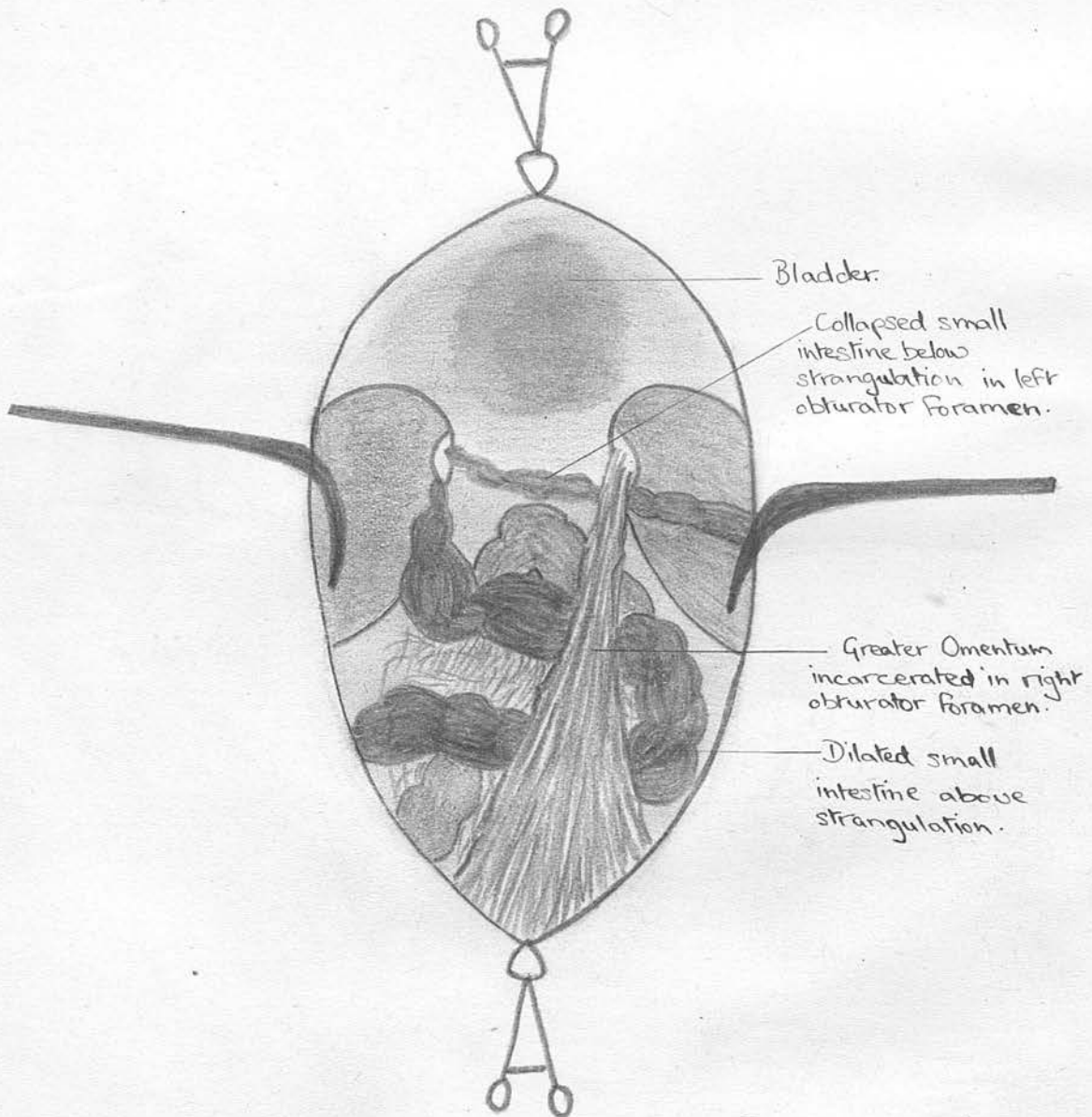
As is so often the case with acute intestinal obstruction an absolute diagnosis was difficult to formulate. The symptoms and signs - vomiting, partial constipation, colicky abdominal pain with ladder patterns and distension - point inevitably to some form of mechanical obstruction but fail to give a guide as to its exact nature. The history extending over only ten days, the continued faeculent vomiting and the gradual uniform distension indicate that the block was probably in the small intestine - but the choice of agent is obviously wide and the diagnostic criteria for the differentiation of possibilities are non-existent.

DIAGRAM

MACK, Phyllis

## OPERATION

Exposure of bilateral obturator hernia.





Three possibilities appeared likely - namely obstruction by an adhesion or band, an internal or undetectable external hernia, or, least likely, a neoplastic obstruction of the small bowel. The demonstration of free fluid and of abdominal tenderness pointed to the likelihood of a strangulated obstruction with associated peritoneal irritation. It was with this in mind that the abdomen was opened.

The consideration of a diagnosis is largely sterile. It was obvious that after as much as possible had been done to correct her grave dehydration it was necessary to look and see rather than to wait and see. Accordingly operation was undertaken as an emergency procedure.

#### PRE-OPERATIVE TREATMENT.

Prior to operation she received two pints of glucose saline ( 5% glucose in 0.9% saline ) in two hours, during which time frequent intermittent gastric suction by an indwelling Ryle's tube was also carried out. Pre-medication was with Omnopon grs 1/3 and Hyoscine grs 1/150 and she was taken to theatre in fairly good general condition - that is relatively much improved.

#### OPERATION.

Mr.A.Ross-Lowden.

Dr.McKinley - Closed  
Circuit Gas, Oxygen and  
Ether.

The abdomen was opened through a right lower paramedian incision displacing the rectus muscle. There was a moderate degree of small bowel distension but no peritonitis. On passing the hand down into the pelvis a long process of omentum was encountered extending to the right obturator foramen and incarcerated in a hernia through that orifice. The omental process was divided between ligatures close to the orifice. The terminal nine inches of ileum were found to be the only portion of the small intestine not dilated and were followed up to the left obturator foramen where the bowel was found to be strangulated in a hernial sac. The pelvis was carefully packed off and the loop slipped out by gently pressing on the thigh; the strangulation was easily released but the gut immediately perforated at the constricting ring on the afferent loop allowing the escape of a small quantity of obstructed ileal content into the pelvis. A swab of the content was taken for bacteriological examination. The strangulation was found to



MACK, Phyllis

Portion of ileum resected.



be of the Richter's type ( vide photograph ) involving nearly the whole of the diameter of the bowel. The affected portion of the gut was black and gangrenous and the constriction ring grey owing to extensive sloughing. Six inches of ileum, including the diseased portion and a margin of healthy tissue were resected and the bowel reconstituted using Shelton Horsley's method of end-to-end anastomosis. The hernial orifice was closed by a purse string cat-gut suture. The pelvis was mopped out with weak Dettol and penicillin-sulphathiazole powder ( 5 grms ) dusted in. The abdomen was closed in layers without drainage.

#### POST-OPERATIVE TREATMENT.

Gastric suction and fluid replacement were continued. Soluble sulphathiazole was added to the intravenous infusion and in view of the delay in obtaining a bacteriological report on the intestinal content penicillin, in doses of 25,000 units every four hours, was given by the intra-muscular route.

The next day her abdomen was distended, tender and silent and her general condition appeared grave. Her fluid intake was satisfactory -  $5\frac{1}{2}$  litres, including a pint of plasma added to the infusion - but her output was unknown as she was incontinent.

She commenced to deteriorate towards the evening of the second day with gross abdominal distension and obvious signs of general toxæmia. She died in the early hours of the following morning; permission to perform autopsy was not granted.

The report on the ileal content became available on the second day of her admission to hospital. It revealed Bact. coli and Enterococcus, both penicillin resistant. On this evidence penicillin was discontinued though sulphathiazole was maintained.

The commentary on this case is deferred until Case II has been described.

## CASE II.

RUSSELL, WILLIAM.  
7, Beech Place,  
Penicuik

Age 78.  
Retired.

Admitted 26.vi.46.  
Died 28.vi.46.

### HISTORY.

Up to 8 p.m. on the day before admission this patient had felt quite well and during the evening he had been working in his garden. At this time he was seized with intermittent griping abdominal pain passing from right to left in the umbilical region. He noticed at the same time a lump in his left groin which though not painful was slightly tender to touch. He vomited once during the night and twice the next morning but by the time he was admitted this had subsided completely. His bowels moved normally during the day prior to the onset of pain but they had not moved since. Further, no flatus had been passed, which, for him, was an unusual event.

To the best of his knowledge he had never had a swelling in his groin before nor had he undergone any operation in that region. He had no previous history of any significance apart from a chronic winter cough and some difficulty in commencing micturition.

### EXAMINATION.

He was a healthy, well-preserved old man of good colour and adequate rationality. Signs of loss of fluid were absent and the tongue was moist though furred.

**ABDOMEN.** This moved freely on respiration and there was no obvious distension or visible peristalsis. A swelling - four by three centimetres - could be seen in the medial part of the left groin apparently below the inguinal ligament. Palpation confirmed this position and showed that the lump was tender and tense in consistency. It was dull to percussion. A fingertip could be introduced into the superficial inguinal ring without difficulty. The rest of the abdominal examination was negative.

**RECTAL EXAMINATION** revealed an empty rectum.

RESPIRATORY SYSTEM. A few moist sounds and rhonchi were audible scattered over the lung fields.

CARDIO-VASCULAR SYSTEM. The pulse showed repeated extra-systoles and the vessel wall was palpable and tortuous. The heart sounds were closed. Blood Pressure 145/80 mms. of mercury.

#### DIAGNOSIS.

In contrast to Case I there was here little difficulty in making a complete pre-operative diagnosis. The sudden onset of trans-abdominal colic, the vomiting and total constipation ( though the significance of this last is doubtful in view of the brevity of the history ) direct attention to the possibility of acute intestinal obstruction. The lump in the groin - appearing out of the blue at the onset of symptoms - and the integrity of the superficial inguinal ring clinch the diagnosis of strangulated femoral hernia. There need be no hesitation in making so precise an observation though it must be admitted that, in comparison with direct inguinal hernia, femoral hernia in an old man is a rare occurrence.

The diagnosis provides the therapeutic answer - operation directed towards reducing the hernia and so preserving the viability of the strangulated bowel. By the time he reached hospital and was ready for operation, after preparation with intra-venous glucose-saline and the institution of suction by an indwelling Ryle's tube, some twenty hours had elapsed since the onset of his symptoms. Furthermore his vomiting had subsided and he claimed to be feeling well in himself. It seemed justifiable therefore to expect to encounter a hernia capable of reduction without interrupting bowel continuity and to give, accordingly, a favourable prognosis. As will be seen such optimism was unjustified.

#### PRE-OPERATIVE TREATMENT.

The nature of this has already been indicated above - intravenous fluid and gastric suction. In addition Omnopon grs 1/3 and Atropine grs 1/100 were given as pre-medication for anaesthesia.

#### OPERATION.

Mr. F. H. Robarts

Dr. McKinley 100mgs  
intrathecal planocaine.

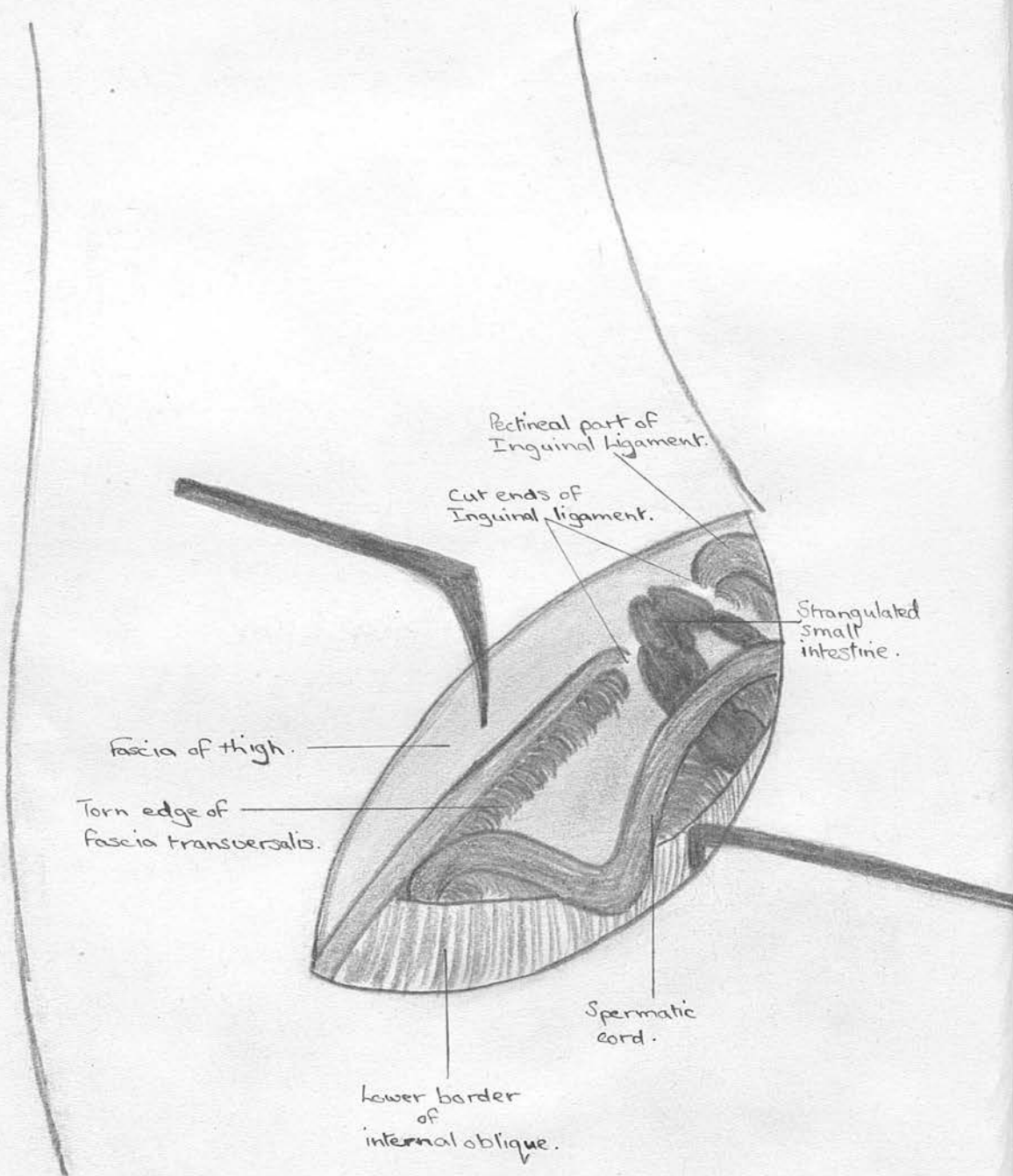
An oblique incision was made in the left inguinal region above and parallel to the inguinal

DIAGRAM.



RUSSELL, William  
OPERATION.

Exposure of left femoral hernia [Inguinal ligament divided]



(The cut edge of the external oblique aponeurosis is retracted.)



ligament and deepened through the external oblique aponeurosis to expose the inguinal canal. The spermatic cord was retracted and the fascia transversalis of the posterior wall of the canal opened below the conjoint tendon to expose the neck of the sac from the abdominal aspect. Dissection was then continued in the upper part of the subcutaneous tissues of the thigh to expose the femoral swelling and the overlying fat. The femoral canal was identified and the sac cleared up to its neck at the femoral ring. The sac was then incised, bloodstained fluid spurting out under considerable tension. A knuckle of small intestine was found inside, discoloured to a deep purple hue. With some difficulty the constriction at the neck of the sac was divided but it was found necessary to detach the inguinal ligament from the pubic tubercle to accomplish this. The bowel was withdrawn for inspection and was wrapped in hot saline swabs. It was found that the portion trapped in the hernia was non-viable, especially at the proximal constriction. Resection of the gangrenous portion with end-to-end anastomosis in two layers was carried out. The bowel was then returned to the abdomen, the femoral sac being completely dissected out and ligated at its neck. Repair was then carried out by bringing the conjoint tendon down to the inguinal ligament with catgut stitches including the pectineal part of the inguinal ligament in the more medial part of the repair. The cord was then replaced in the canal, the external oblique aponeurosis being sutured with continuous cat-gut, the skin with silk worm gut interrupted sutures.

( There seems to be some difference of opinion as to the correct name to apply to this operative approach. Lotheissen certainly described it in some detail but his account is held to be antedated by that of Pary and also possibly Annandale. The operative procedure undertaken in this case - division of the inguinal ligament - was that described by Hey Groves ).

#### POST-OPERATIVE COURSE.

In view of the septic field opened at operation it was decided to employ systemic chemotherapy; soluble sulphathiazole was accordingly added to the intravenous drip and penicillin - 50,000 units every four hours - given intra-muscularly. Intravenous fluid was continued slowly in an endeavour not to overload the lungs and circulation.

The following day his condition was rather poor but he was conscious and rational. The abdomen was slightly distended and tender. His fluid intake was 3460 ccs. and output 1140 ccs and he received one pint of plasma during the day.

On the 28th he was at first less distended and seemed fairly comfortable. In spite of continued gastric suction his abdomen filled out during the day and at midday he became very breathless and cyanosed with basal dullness and areas of diminished air entry. His pulse became rapid and completely irregular and it was clear that his cardio-vascular system was failing. He continued to deteriorate during the afternoon and died at 4.30 p.m.

#### POST-MORTEM FINDINGS.

PERITONEAL CAVITY showed mild generalised fibrinous peritonitis with scanty turbid free fluid.

SMALL INTESTINE was greatly distended throughout its whole extent. The coils were matted together and contained gas and a thin yellow fluid. A recent end-to-end anastomosis of the lower ileum showed good union with no signs of leakage or stenosis.

LARGE BOWEL was greatly distended.

HERNIAL TRACK. This was found extending for 5 cms below the inguinal ligament. The mouth of the femoral ring was closed by the operative repair.

PLEURAL SACS. The left was largely obliterated by old adhesions. There was but a trace of fluid in both cavities.

LUNGS. Both were heavy. The lower lobes were voluminous and on section both showed hypostatic pneumonia throughout the posterior part. In the right lung this appeared to be an early lesion, a turbid oedema rather than a frank consolidation. In the left lung consolidation was more definitely established, pus being present in the bronchi of the lower lobe.

PERICARDIAL SAC. This contained a trace of fluid.

HEART AND AORTA. The organ was slightly enlarged but of normal shape. The pericardium and coronary arteries appeared healthy and there was no dilatation. The left ventricle showed considerable hypertrophy but the myocardium was of good colour and consistency. The aorta showed a minimal degree of atheroma and there was no evidence of embolism of the pulmonary artery.

## A. INDIVIDUAL CASES.

### CASE I.

Though it would be possible to consider this interesting case in some detail only a few points will be singled out for mention.

Firstly as regards the pre-operative diagnosis it would seem well to consider - though it is easy to be wise after the event - the possibility of this rare strangulated hernia in undiagnosed cases of acute obstruction in the aged. Why obturator hernia should largely be a disease of the old, wasted female is difficult to understand, but the type of individual serves as a pointer to the investigation of pain along the medial aspect of the thigh and deep tenderness in the adductor region at the root of the lower limb. Such findings, though not diagnostic, are at least helpful and are most unlikely to be elicited unless deliberately looked for. In passing also we might mention the pitfalls of repeated small results from the administration of enemata in the Richter's type of hernia where the obstruction to the bowel is incomplete

Secondly it is interesting to note that so long a time could elapse before strangulation of the gut was so complete as to result in gangrenous perforation. It is reasonable to assume that total strangulation - as distinct from obstruction - of the ileum was a relatively recent event, possibly coinciding with the recrudescence of symptoms shortly before admission to hospital. In spite of the length of the history the general cavity of the peritoneum was unsoiled at the time of operation and but for the perforation of the afferent loop might have remained so.

Thirdly, as regards the post-operative course of the patient it must be assumed that peritonitis - the result of soiling in the presence of obstruction - was a major factor in the fatal result. Peritonitis of this type - producing the silent distended abdomen and gradually advancing toxæmia - appears extraordinarily difficult to check even with apparently adequate chemotherapy; indeed there is much truth in the statement that peritoneal soiling in the presence of obstruction is an inevitable harbinger of death.

As has been said it is all too easy to be wise after the event and without doubt all efforts would have been vain in this case. The length of the history which resulted in the patient being presented for surgery in a poor condition and the peritoneal soiling militated against success.



## CASE II.

As in the foregoing case one is faced with the problem of submitting an aged individual to an extensive operative procedure. Here however, there was no delay in the institution of surgical measures and the outlook appeared on the whole favourable. It is clear that the viability of the bowel had been impaired beyond expectation by the anatomical peculiarities of femoral hernia; further blood and plasma loss into the lumen and hernial sac had probably added to the general disturbance of the patient. The local success of surgery is evident by the soundness of the union and the lack of suppurative peritonitis; but the failure of even the most successful operative procedure to carry the aged patient round the corner of a major emergency is evident in the hypostatic pneumonia and extensive ileus.

## GENERAL COMMENTARY.

It is of no small significance that the two fatal cases of small bowel obstruction here considered both involved strangulation of the intestine. In fact this would appear to reflect a general principle in the surgery of small intestinal obstruction - that non-strangulating obstruction carries, as a rule, a low mortality, the reverse holding true for the strangulating variety. While part of the significance of this lies in the nature of the pathological change in the bowel wall in the two types of obstruction we must, nevertheless, look further than this for a complete explanation. Though generalisation is a dangerous habit we may say that it is usual for strangulating obstruction to be more common in the more elderly age groups, the simple variety having its maximum incidence at a lower age. In addition, it is the good general condition of the relatively young patient which leads to an increased chance of survival should strangulation render this necessary, while in the old cardio-vascular degeneration and respiratory impairment renders recovery after major surgery more dubious. It is true to say that the older patient has the die cast against him not only because the strangulating type of obstruction is more likely but because extensive surgery for which he is unsuited is usually necessary.

These brief remarks, on what is essentially a complex problem tend possibly to exaggerate the dangers to the old. Age in itself may be no hazard to surgery ( see Lancet 1946 ) but in the treatment of the surgical emergency for which the patient is neither physically or psychologically prepared it is often of

grave significance.

We are led by these remarks to mention one of the vexed problems of the surgery of small bowel obstruction - namely the decision to resect or not to resect gut of obviously impaired vitality. In some instances, such as Case I of the present series, there appears no adequate alternative - perforation of the wall secondary to gangrene forcing the removal of the devitalised part; in others, however, of which Case II forms an example, it is a decision of some weight to carry out a major, traumatising procedure when there is a distinct possibility that the bowel might survive. Automatically, if resection is carried out in an old man, already suffering from acute intestinal obstruction and its accompanying systemic upset, his chances of survival are greatly decreased. It is not that the union of the resection may fail, as the case under consideration shows, or that the operation has any great technical difficulties or pitfalls, but merely that the nature of the procedure apparently calls for too much on the part of the patient. Mortality of resection operations in such circumstances will remain high in virtue of the clinical material requiring the radical intervention.

It is perhaps too simple to attribute the high mortality of cases undergoing resection merely to the effects of surgical trauma. Such patients are more often than not the late type in which obstruction is well established; they are, as has been emphasised, frequently old; they are weakened further by blood and plasma loss into the strangulated loop. Indeed, without doubt many represent some of the hard core of mortality from intestinal obstruction - a core which will be referred to again in this essay. One may represent the surgery of intestinal obstruction, more particularly that of the strangulating small bowel variety, as a complex graph on which as the time passes the magnitude of the surgical procedure rises as or more rapidly than the general condition of the patient falls; at some critical point the two variables become so far separated as to render recovery improbable.

It would be unfair to criticise radical resection of potentially divitalised gut without some consideration of alternative courses of action. They are few in number and erratic in their results - so much so, in fact, as to render resection with primary anastomosis still the operation of choice in the eyes of most surgeons.

Chief among the procedures which suggest themselves is the rapid termination of the operation by



the exteriorisation of the affected loop of intestine. This is a subject the purpose of which appears to be poorly understood by many writers on the problem. Exteriorisation as practised in definitive surgery is a recognition of slow healing and the dangers of peritoneal infection when an attempt is made to secure primary union in some parts of the gut, notably the large intestine. Against its use in the emergency surgery of the small intestine is the rapidity and certainty of healing - a truth to which Case II bears witness. Further, it is stated that a patient with an ileostomy produced by exteriorisation of the small intestine will at once "leak to death" from extensive loss of fluid, much as the patient with high intestinal obstruction dies from electrolyte and fluid depletion. If indeed, we were to consider only the importance of healing of the anastomosis there would be no place for the exteriorisation operation. But it is a completely different factor which, apparently, leads to the death of so many of these cases - that of operative shock as a result of resection in an unsuitable patient. The one objection to bringing the bowel to the surface is, therefore, the tremendous fluid loss that may occur through an ileostomy.

While there is no doubt a great deal of truth in this conception of rapid dehydration following ileostomy it is undoubtably also feasible to maintain a patient in fluid and electrolyte balance by combining parenteral and intra-ileal administration of fluid into the distal orifice of the abdominal opening. Return of the ileal content draining from the afferent loop has also been successfully practised and it has even been suggested that some sort of enterostomy using a rubber tube could be carried out in the distal loop of gut. The technique of all such manoeuvres is, however, not only clumsy but also difficult and out of all the vast amount of experimental work that has been done on fistula of the small intestine, little of practical value appears to have emerged except a general and possibly ill-founded dislike for establishing an artificial opening. Certainly it is not a procedure for routine use when adequate facilities for the performance of primary resection and anastomosis are available; but, in cases such as II of the present essay, it might form a safer way out than the drastic resection with its inevitably high mortality.

To sum up on the question of resection and end-to-end anastomosis it is worth while emphasising that, in theory, the operation is faulty; no surgeon of the British school attempts to treat perforated peptic ulcer by partial gastrectomy nor yet to perform one stage resection of a tumour of the large bowel in the presence of

obstruction. It is not only factors of healing that deter the operator from such procedures, but merely the fundamental idea that in emergency surgery it is sound to do as little as possible compatible with removing the immediate cause of the patient's illness, whether it be perforated viscus, haemorrhage or the presence of obstruction. It might be similarly submitted that resection with anastomosis - a definitive and if the patient survives curative operation - is violating this idea of least action and is indeed inconsistent with the general condition of the patient. The reply is, of course, that local tissue death such as occurs in strangulation renders removal the operation of choice; this must undoubtedly remain true but should nevertheless be tempered to the condition of the patient.

We may make brief mention of the remaining alternative to resection - a procedure which has been advocated ( but, one would imagine, rarely employed ) in the internal strangulations of the very young. This consists in " bundling " the affected segment of bowel in a thick sheath of omentum, securing it there with a few sutures and returning it so encased to the abdomen. There is little doubt that the omentum can have little influence on the vascular supply of the bowel and that any influence it has is merely a protective one in preventing the spread of infection within the peritoneal cavity. Unlikely as this procedure is to be practised in many cases, a critical evaluation of its worth in strangulated obstructions where resection is a dangerous operation is difficult to obtain. It would appear to have a possible application in a very limited field and requires more experimental backing before it can be used with any confidence.

The consideration of fluid loss through a fistula in the small intestine leads to a brief consideration of the problem of fluid replacement in intestinal obstruction. Clinically it appears vital, in view of the repeated vomiting, the fluid distension of long reaches of bowel, the dehydrated appearance of the patient and the findings in the blood chemistry to push fluid replacement to the greatest length possible. And yet these clinical indications must be, in the individual case, subject to considerable modification. In dealing with old patients, such as the preceeding two cases, the possibility of overloading the circulation must be constantly born in mind. It is significant that death in these cases is frequently associated with a degree of basal pneumonia insufficiently explained by the clinical findings in the lungs - the result not only of terminal cardio-vascular failure but possibly also of overloading the venous return to the heart. It is by no means clear that dehydration is the outstanding cause of death in

ileal obstruction - however potent it may be in high intestinal obstruction - and there is a growing body of opinion that gaseous and fluid distension is the disturbance of fundamental importance. Accordingly the use of intravenous fluids while not to be eschewed must be cautious, especially in the old patient whose cardio-respiratory reserve is almost invariably reduced. In fact, if the results of experimental work are to be carried into practice fluid replacement should take second place in therapeutic importance to operative or non-operative decompression of the intestine.

How to strike a balance between dehydration and waterlogging of the tissues in these cases is a matter of some difficulty and would appear to offer scope for future research. The urinary output gives a useful if rough guide and estimation of the urinary or blood chlorides suffers only from the disadvantage that it is time consuming and that the information is largely out of date by the time that it reaches the bed-side. Some evaluation of a physical constant of the blood - such as specific gravity, viscosity or cell-fluid ratio - might be applied to this problem. The Van Slyke method of estimating plasma proteins is a pointer in this direction.

It remains to consider the general indications emerging from the two fatal cases here described. It is clear that early diagnosis - before occlusion becomes vascular strangulation and intestinal obstruction - is a vital necessity if death is to be avoided. Once the gut is devitalised, particularly in the old patient, the necessity for extensive surgery and the poor general condition of the patient render the outlook guarded if not frankly gloomy. In view of this there may still be room for the occasional use of such methods as exteriorisation - methods which have, in the past, been largely discarded as unsuitable where they can be avoided. Finally, caution is definitely necessary in giving fluid to patients suffering from cardio-respiratory impairment, whether primary, or secondary to gross abdominal distension. A balance must be struck between dehydration and broncho-pneumonia, remembering that more than lip-service should be paid to the conception that distension rather than dehydration is the cause of death in ileal obstruction.



## SUB-ACUTE LARGE BOWEL OBSTRUCTION

### CASES III and IV.

"....Insidious in its onset and protean in its manifestations it steals upon its victim like a thief in the night with the result that when the patient realises all is not well the disease is no longer in an early phase."

R.Keers and B.Rigden.

PROBAM, MRS. JESSIE.  
29, Drum Park Street,  
Thorney Bank,  
Glasgow.

Age 44

Admitted 29.v.46.

Died 30.v.46.

#### HISTORY.

Fourteen weeks before the 29th. of May this patient began to have intermittent "gripping" pains in the abdomen at the level of the umbilicus. This had recurred off and on ever since and she stated that she had never known a day completely free from colic. In consequence she was extensively X-rayed in Glasgow six weeks before her admission to the Royal Infirmary; she was informed that the results of these investigations were negative.

For the two weeks prior to admission the pain though remaining of the same type had steadily increased in frequency and intensity. For upwards of ten days she had had no spontaneous bowel movement though before this she had normal and regular action. Enemata given over these ten days had produced but poor results. With the cessation of bowel movement she had noticed a slow progressive abdominal distension and in the last week she had suffered from nausea and occasional vomiting. This had, however, subsided in the last two days before her admission.

Her appetite had been poor for some time and she considered that she had lost about two stones in weight in the past two months.

Previous to this occasion she had been fairly well without evidence of gastro-intestinal disease, urinary symptoms or dysmenorrhea.

#### EXAMINATION.

She was a thin pale woman with a dry furred tongue, superficial evidence of extensive loss of weight and dehydration.

ABDOMEN. This showed marked uniform distension and visible peristalsis could be clearly seen passing from right to left in the umbilical region. There was slight general tenderness and the abdomen felt tense



to palpation. The hernial orifices appeared normal and auscultation revealed increased peristaltic sounds.

RECTAL EXAMINATION. There were no faeces in the rectum. Otherwise there was no positive finding.

RESPIRATORY SYSTEM. Apart from a poor expansion and a few scattered accompaniments throughout the lung fields this appeared normal.

CARDIOVASCULAR SYSTEM. Examination here was negative except for a blood pressure of 165/110.

#### DIAGNOSIS.

Persistent colic with abdominal distension and the history of a definite change in the bowel habit are indicative of an organic obstruction until proved otherwise by all the diagnostic measures available - including laparotomy. The slow onset, the lack of emphasis on vomiting and the progressive abdominal distension do not suggest typically either large or small bowel obstruction, though apart from the uniform distension they are slightly in favour of the former. The systemic upset extending back for some time however would appear to favour the possibility of some neoplastic condition inspite of the relative youth of the patient. Malignant disease is, of course, almost entirely confined to the large bowel and consequently, all things considered, a stenosing carcinoma of this region was the most probable diagnosis.

It was accordingly decided to open the abdomen on a tentative diagnosis of sub-acute obstruction due to a malignant stricture of the large gut. The patient was observed not to be in too good general condition but it was thought that with suitable fluid replacement and with adequate operative decompression, there was little risk in explorative laparotomy.

#### PRE-OPERATIVE TREATMENT.

A Ryle's tube was passed into the stomach and, after aspiration of a quantity of bile stained content, left in situ. An intravenous plasma drip was started and Morphia grs 1/4 and Atropine grs 1/100 given as pre-medication. Operation was carried out after three hours of intravenous fluid ( 1 pint of plasma ) and after the pre-medication had been acting for forty minutes.

## OPERATION

Mr F.H.Robarts.

Dr. McKinlay - Closed  
circuit nitrous oxide,  
oxygen and ether

A right para-median, sub-umbilical, muscle displacing incision was made by the usual technique. A considerable amount of free yellow-coloured fluid escaped on opening the peritoneum and the small bowel was seen to be grossly distended. The distension was followed down into the large bowel where it was found to extend as far as the middle of the descending colon at which point a " string stricture " type of carcinoma was readily palpable. The caecum was seen to be enlarged and hypertrophied. There did not appear to be any glandular involvement in the colonic mesentery and the palpable surface of the liver was free from metastases. It was considered best, at this stage, to decompress the bowel by caecostomy and for this purpose a grid-iron incision was made in the right iliac fossa. The caecum was withdrawn and two concentric purse-string sutures inserted into its wall. Through the isolated segment a De Pezzer catheter with the distal part of the expansion cut off was inserted and the purse-string drawn tight. The point of insertion was further strengthened by the insertion of a few Lembert's sutures. The peritoneum of the incision was then stitched to the caecum thus bringing to the surface the area of caecal drainage. The wound was closed in layers around the tube, the latter being secured by a transfixing stitch through its wall. The paramedian incision was closed in the usual manner without drainage.

## POST-OPERATIVE COURSE.

Though she left the theatre in good condition her general state soon deteriorated with a rapid fall in blood pressure. She never truly came round from the anaesthetic, remaining confused, dyspnoeic and cyanotic. In spite of coramine, oxygen and carbon dioxide she died in the early hours of the morning following operation.

## POST-MORTEM REPORT.

LARGE BOWEL. The caecum showed evidence of a surgically closed caecostomy attached to the anterior abdominal wall; the region of drainage was healthy and showed no sign of inflammation. In the middle part of the descending colon

a tumour mass was found to have infiltrated the wall and to surround the bowel as an annular growth producing an extreme degree of stenosis. The infiltrated area showed ovoid rather superficial ulceration with elevated and indurated edges. The tumour itself had extended into the adjacent tissues slightly infiltrating the lower pole of the left kidney. The bowel above the malignant stricture was enormously dilated and distended with gas; its walls were moderately hypertrophied. The bowel below the stenosis was collapsed and almost empty. Faecal masses were found on the proximal side of the stricture but there was no evidence of stercoreal ulceration.

**HEART AND VASCULAR SYSTEM.** The heart was rather small but of normal shape, the sub-epicardial vessels running rather tortuously. The myocardium showed a brown discoloration; the right ventricle was slightly dilated, the left showed no abnormalities. The valves were healthy but the coronary arteries showed a slight degree of atheroma causing irregularity of their lumen. Atheroma was also to be seen in the Aorta.

Microscopically the appearances in the myocardium were consistent with brown atrophy.

**RESPIRATORY SYSTEM.** The lungs showed only terminal oedema and basal congestion, but a nodule removed from one sub-pleural surface and thought to be silico-anthraccotic in nature proved on section to be a deposit of true adenocarcinoma.

**KIDNEYS.** The left kidney was adherent to the descending part of the colon and the lower pole was infiltrated by the tumour mass. Otherwise both organs were normal.

Microscopically the tumour was found to have the typical structure of a well-differentiated adenocarcinoma with an abundant stroma reaction.

The commentary on this case is deferred until Case IV has been described.



GRELLIS, JAMES.  
20 Traquir Park East,  
Corstorphine.

Age 63  
Retired Army Officer.

Admitted 19.vi.46.  
Died 1.vii.46.

#### HISTORY.

Three months before admission this patient became constipated quite suddenly; before this his bowels had always been quite regular. Since the onset of this illness they moved only once every three to four days and then only with difficulty and inadequate results. He had tried all sorts of medicine but without any noticeable effect.

In the last two weeks he had noticed that his abdomen had become gradually distended though he still managed to defaecate and pass small quantities of wind per rectum, the latter apparently relieving the feeling of distension in his abdomen.

One week before admission he began to have attacks of vomiting in which he brought up mainly fluid - latterly of a brown colour. He had not to his knowledge lost any weight and it was only in the two days before he came to hospital that he had felt at all weak. The day before admission he had had what appeared to be a type of fainting fit from which he had recovered in a matter of minutes.

He had never had previous digestive symptoms nor any serious illness. Respiratory and urinary symptoms were absent.

#### EXAMINATION.

He was a well built man of asthenic appearance and good colour. His skin was somewhat loose and very dry; his tongue similarly was dry and furred.

ABDOMEN. There was considerable uniform distension with a tympanitic note on percussion. Tenderness was absent and there was no evidence of guarding or rigidity. The liver and spleen were both impalpable and the only other

finding of note was obvious splashing and the presence of increased peristaltic sounds.

CARDIO-VASCULAR SYSTEM. The vessel wall was palpable and tortuous, the heart sounds closed at all areas. Blood pressure was found to be 160/88.

RESPIRATORY SYSTEM. Was negative.

SPECIAL INVESTIGATIONS. (1) X-Ray before admission showed gaseous distension of the colon above the level of the descending colon and also of coils of small intestine. There were multiple fluid levels. "The appearances are not sufficiently defined to localise the site of the obstruction but it is probably in the lower colon."

(2) Carbon dioxide combining power was 66.5 mgs.%, Plasma Chlorides 432 mgs.% and Blood urea 25 mgs.%.

#### DIAGNOSIS.

The change in the bowel habit, the gradual distension and vomiting speak eloquently of sub-acute intestinal obstruction. Adequate confirmation of this is provided by the presence of multiple fluid levels in the X-Ray. As in the preceeding case the exact cause and site of the obstruction is difficult to localise. The gradual onset in a man past middle years would suggest in association with the general appearance of the patient - an impression difficult to convey in words - a malignant lesion of the large bowel; the late occurrence of vomiting would further suggest the involvement of a comparatively isolated segment of intestine such as the colon. Multiple fluid levels, on the other hand, indicated that stasis is present in the small intestine and were it not for the presence of gas in the colon and for the history might direct attention towards the small bowel as the site of the lesion.

Whatever the cause of the condition it was clear that operative decompression was likely to be the correct course of treatment and it was, accordingly, decided to open the abdomen after adequate preparation

#### PRE-OPERATIVE TREATMENT.

Glucose -saline, by the intravenous route, and gastric suction were started at once and continued for twenty-four hours. On the next day he felt well but his abdomen was more distended and tense. After pre-medication with Morphia and Atropine in the usual dose ( vide case III ) laparotomy was undertaken.



## OPERATION

Mr. F. H. Robarts

Dr. Stratton - 100mgs  
intra-thecal planocaine.

A right para-median incision was made just above the level of the umbilicus and splitting the rectus. The peritoneal cavity was opened and it was immediately found that <sup>the</sup> coils of small intestine presenting were only moderately distended but were firmly adherent one to the other with a plastic peritonitis. The loops of the bowel could, by blunt dissection, be fairly easily separated and eventually the transverse colon was isolated and found not to be greatly distended. The incision was then extended downwards in order to explore the right iliac fossa, but here the adhesions became much more numerous and separation was not readily obtained. All the loops of bowel defined appeared to those of higher small gut and as there was no guarantee that anastomosis between these loops and transverse colon would overcome the obstructive process, it was thought wisest to close the abdomen and treat the case conservatively. The abdomen was therefore closed in layers without drainage.

## POST-OPERATIVE COURSE.

Intravenous fluids and gastric suction were continued in the immediate post-operative period and his course may be summarised as follows:-

21.vi.46 He was still distended though more comfortable than before his operation.

22.vi.46 He developed a slight cough and, accordingly, was started on penicillin by the intra-muscular route in doses of 25,000 units every four hours.

24.vi.46 The general condition and the distension continued to improve slowly. Fluid and faeces were passed per rectum and accordingly fluid replacement and suction were discontinued.

25.vi.46 There was still clinical evidence of dehydration though general improvement was maintained. Intra-venous glucose was therefore restarted. The bowels moved spontaneously.

26.vi.46. He was still distended on this day and in much the same general condition. It was considered that parasympathetic stimulation might overcome the residual ileus present and with this in mind he was given 1 cc. of pituitrin and 1/100 gr. of eserine by subcutaneous injection. A flatus result was obtained from the enema given following this injection.

27.vi.46. Pituitrin and eserine were repeated as his bowels had failed to move spontaneously. There was a flatus but no faecal result.

28.vi.46. He appeared well on this day and was taking small quantities of solids and liquids by mouth. There was however no response from his bowels even to the administration of an enema. Tympanitic abdominal distension was still present though he had passed small amounts of flatus at infrequent intervals.

29.vi.46. During the night and morning there was a slight slow subsidence of the abdomen, associated with the passage of flatus per rectum, but in the afternoon he suddenly became very dyspnoeic and cyanosed with a rapid pulse and respiratory rate ( pulse 130 per minute, respirations 35 per minute ). Moist sounds were present at both lung bases and the percussion note was hyper-resonant in the upper lung fields. A slight amount of peripheral oedema was demonstrable over the sacrum and at the ankles. It was considered that there had been a sudden onset of congestive cardiac failure, this observation being supported by the presence of venous congestion. Accordingly he was given 0.75 mg. of Digoxin by the intravenous route and 1/6 gr. of morphia hypodermically. In addition, 6 ozs. of blood were removed by venesection and an attempt was made to administer oxygen by the use of a B.L.B. mask. This latter was but poorly tolerated.

Under this treatment he improved slightly though his blood pressure remained unrecordable for the rest of the day and night. Next morning it was 125/80 in the early hours.

30.vi.46. The abdomen was still very distended - indeed more so than on the previous day and respiration was shallow and rapid. Digoxin was repeated in a dose of 0.25 mg. by mouth in the morning and evening. A further venesection was carried out in an effort to relieve the gross pulmonary congestion but later in the day it was obvious that the continued presence of intestinal obstruction with abdominal distension and presumably fluid loss into the dilated bowel, was rendering him gravely dehydrated. Intravenous plasma was accordingly cautiously started in an effort not only to correct the dehydration but to avoid increased basal pulmonary oedema. His condition was .

by this time very grave. Repeated attempts were made to re-institute gastric suction and so effect some degree of decompression of his upper intestine but he was extremely intolerant of the presence of a Ryle's tube. Suction was eventually achieved, but yielded little in the way of gastric content.

1.Vii.46. The evidence of a failing circulation with increased respiratory embarrassment became more marked and his rationality completely disappeared. He died early in the day.

#### POST MORTEM REPORT.

**ABDOMEN.** On external examination this showed marked generalised distension and there was a recent right paramedian incision. The peritoneal cavity contained free fluid in small quantity and all the viscera were bound together by dense fibrous adhesions which appeared to be at least four weeks old, since no evidence of fibrinous remnants could be found and the adhesions were firm.

**GASTRO-INTESTINAL TRACT.** The stomach showed no abnormal findings. The small bowel was irregularly distended throughout its whole course. The large bowel was greatly distended from the caecum to a point about halfway down the descending colon where there was an annular constriction of the gut producing partial but not complete stenosis. Below the lesion the gut was only slightly distended. This stricture was a typical "string carcinoma" consisting of a ring of infiltration about two centimetres wide encircling the bowel and showing a good deal of ulceration. There was no sign of perforation.

**LUNGS AND PLEURA.** Each pleural cavity contained about 100 ccs of slightly turbid fluid with flakes of fibrinous exudate. Both lungs were heavy and on section both lower lobes and the posterior part of the left upper lobe showed well-established broncho-pneumonia with small gray patches of granular consolidation and greatly oedematous intervening lung tissue.

**HEART AND PERICARDIUM.** The heart appeared normal in size and shape; the pericardium was healthy but the coronary arteries showed a moderate degree of atheroma with no serious stenosis. On section the myocardium, though pale, was healthy.

The pathologist concerned made the following comment:-

" The mode of origin of the peritonitis is not quite clear.

No obvious perforation could be seen at the site of the carcinoma. It seems probable that the peritonitis occurred at the time of the spread of infection through the distended bowel wall without gross perforation and that perhaps with some improvement in the degree of obstruction the peritoneal infection subsided. At post mortem there was no evidence of active peritonitis. Death appeared to be mainly due to broncho-pneumonia."

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COMMENTARY - CASES III AND IV.

As is to be expected the clinical features of the two cases of large bowel obstruction differ somewhat from those of the first two of the series. Both show a relatively gradual onset of disease, compatible with the slowly developing lesion responsible; both show the rather striking emphasis on change in the bowel habit that is commonly found in these cases; further they have in common a lack of vomiting in the history until relatively late in the course of the history.

The diagnostic features of these cases are, accordingly, fairly typical and need detain us no further; we might mention in passing, however, the help that can be obtained from X-Rays ( the straight film of the abdomen or " scout " film as it is usually known in America ) in the localisation of the lesion. Without doubt, an obstruction tentatively placed in the large bowel on clinical grounds may be more accurately located by the use of X-Rays. Such localisation may, in individual cases, be of value in treatment - indicating a blind decompression in a case that might otherwise necessitate laparotomy to arrive at an exact diagnosis of the level of obstruction.

Just as the diagnostic criteria differ in cases of large bowel obstruction, so do the principles of treatment. The problem in malignant obstruction of the large bowel - or speaking more generally in occlusion where the vitality of gut wall is not immediately or rapidly impaired - is to effect a decompression of the distended bowel without making any attempt to remove the underlying cause of the obstruction. The value of " exteriorisation resection " as applied to the large bowel has already been mentioned in connection with the possible failure of suturing in a distended, oedematous bowel wall; we need consider it no further here. Suffice to say that very few - if any - surgeons consider it permissible to deal with the primary lesion until the tension has been lowered within the bowel lumen, the gut rested by some form of shortcircuit and the highly infected obstructive content allowed to drain away.

Before considering operative procedure as applied to these cases, we may mention the claims of conservative treatment in obstruction of the large bowel. It is clear, primarily, that the issue as regards operation is less urgent than in strangulating small intestine obstruction. There is not the same desire to save potentially devitalised gut or to prevent gangrenous perforation of a viscus deprived of its blood supply. Theoretically, at least, the question of urgency of operation would appear to turn on the competency or otherwise of the ileo-caecal valve; if competent a closed loop progressively distensive type of obstruction with vascular impairment may be produced affecting

the large bowel alone and leading to ischaemia of the caecal wall, gangrene and perforation. If incompetent, a gradually "ascending" obstruction with increasing toxæmia and dehydration is the result. It has commonly been taught in recent years that the ileo-caecal valve in large bowel obstruction remained competent in the majority of cases; it is of interest, therefore, to note that in both these cases the valve was clearly incompetent by the time they came under observation. This is shown by the small bowel distension observed both radiologically and at operation. In neither case, accordingly, could the dangers of closed loop obstruction constitute an incentive to early operation; conservative treatment can, under such circumstances play an important part in fluid replacement and intestinal decompression by an indwelling tube. Operation is undoubtedly the procedure of choice once the diagnosis of obstruction has been established but undue haste in opening the distended abdomen is to be avoided.

The choice of a suitable method of conservative decompression presents some difficulty; it would seem, however, that in both the cases at present under review - in which long reaches of the small intestine, from the ileo-caecal valve upwards, were converted into stagnant pools of faeculent material - simple gastric aspiration was unlikely to prove effective beyond the prevention of vomiting. Indeed it would seem to the writer that obstruction of this type is one of the indications for the use of the double-lumen intestinal tube capable of decompressing the small bowel throughout the greater part of its length. This is not of course to subscribe to the idea that the Miller-Abbot tube is an indispensable adjunct to major bowel surgery - a view held by some authorities particularly in America.

It has been emphasised that operation is the best treatment in the great majority of cases of large bowel obstruction, but in view of the foregoing remarks on conservative decompression mention may profitably be made of Sir David Wilkie's aphorism on the management of intestinal obstruction. This was to the effect that treatment ( of whatever nature ) should be prompt but not precipitate. In promptitude, early non-operative decompression has a definite place and should where it is possible and indicated by the clinical features of the case precede the precipitation of a patient onto the operating table with his gut still choked by the sludge of many weeks partial or complete obstruction. Gastric or duodenal aspiration satisfactorily checks vomiting by emptying the stomach and may, by the removal of regurgitant fluid, achieve a certain degree of decompression; but that this effect is neither great nor rapidly attained is

evident from the small bowel distension encountered at operation in the two cases under consideration

The laying down of laws and the formulation of criteria is an all too facile procedure and one to which, unfortunately, there is no end. All that has so far been said on the relative merits of conservatism and operation has a certain basis in observed facts. And yet, the how, when and why to operate in large bowel obstruction can never be learnt from a text book ( as some publishers would have us believe ) or appreciated from the adherence to preconceived ideas. Such patients require close observation and wide experience if the crucial moment is to be found; such surgical intuition is not susceptible to analysis nor is yet the prerogative of the inexperienced.

Brief mention may now be made to the choice of operation in large bowel obstruction. Blind decompression is to be eschewed unless the patient is gravely ill ( vide Case V of the present series ) or the nature of the lesion and its exact position is well established by positive evidence such as that of the palpating finger or less commonly X-Rays. Laparotomy, with these reservations, is the procedure of choice; once the nature of the obstruction has been determined - in Case III easy, in Case IV as it turned out impossible - two methods of decompression are possible, namely caecostomy or, if the position of the lesion permits, transverse colostomy. This is not the place to enter into a discussion of the relative merits of the two operations; arguments on both sides are numerous and until some controlled series is forthcoming personal preference and the nature of the pathology found at operation will largely determine the type of short-circuit undertaken. From my own limited experience, it appears that the operation of colostomy which exposes the bowel in continuity is a better procedure for drainage as well as being a better preliminary to the radical treatment of the obstructing agent where this is deemed ultimately possible. Caecostomy does not however immobilise such extensive lengths of bowel and was carried out in Case III as doubts were expressed as to the amount of large bowel available for the subsequent mobilisation of the tumour. In such a case transverse colostomy has undoubted disadvantages.

In discussing operation it is pertinent to refer to the problem of Case IV. As has already been seen it was impossible fully to explore the abdomen and the choice lay between conservative therapy and a blind decompression in the proximal half of the large bowel. In view of the lack of gross large bowel distension and the presence of an intra-abdominal condition compatible with the patient's condition a conservative course was decided upon. The use, however, of distension of individual lengths of intestine -



in the presence of an incompetent ileo-caecal valve and of partial obstruction modified by the repeated use of enemata - as a criterion of obstruction is not necessarily sound. The process may be rather a stasis - a slowing down of the intestinal stream - with increased intra-luminal pressure and disturbance of the physiological gradients in the bowel, not merely a pure distension which indicates a later stage of the condition. It would seem good policy, therefore, to perform operative decompression in such vague cases provided it is possible to say on sound evidence that the obstruction is probably in the large bowel. At the worst an easily removed artificial anus is made; at best it will circumvent an undiscovered lesion which may be revealed by appropriate investigation at a later date. Blind proximal decompression has its dangers but if forced upon the operator by such unusual features as those of Case IV may well be ventured upon.

We may sum up on these cases as follows:-

CASE III. It would seem undoubtably true to say that the long period of stagnation from partial obstruction with the gradually increasing systemic effects of intestinal distension were prominent factors in the death of this patient. While it is possible that any operative intervention even at a much earlier stage might have precipitated circulatory failure there is hardly sufficient pathological evidence that this was the case. I have seen recently another case of carcinoma of the descending colon under the care of Mr Pierce of the Blackburn Royal Infirmary which, coming late to surgery died on the day following operation from an acute cardio-vascular collapse of unknown aetiology. Such immediate postoperative collapse after relatively minor intra-abdominal exploration and manipulation is difficult to explain.

The remaining interesting feature of this case is its failure to conform to the usual pathological sequence of events followed by carcinomata of the colon; blood born metastases and local infiltration of neighbouring organs do not normally go before invasion of the lymph nodes of the colonic mesentery. Such an occurrence as this must, if we are still to accept the classic theory of sequence of secondary spread, be regarded as a curiosity.

CASE IV. Here the cause of death was undoubtably the failure to secure adequate operative decompression and supplies an object lesson in the dictum that progressive distension is fatal. The operative failure was the result of a mysterious peritonitis, insufficiently explained at autopsy. If it could have been more securely

established - and indeed on looking back on the case the bulk of the evidence was in favour - that the real cause of the obstruction lay in the descending colon, either a blind proximal decompression as already described or some unorthodox approach to expose and exteriorise the root of the trouble might have been attempted.

Criticism is facile and a review such as this rarely fails to reveal some error that might have been corrected, some detail that should not have been overlooked; but it is only by criticism that we can hope to learn how to reduce mortality in such cases. It has been said with some force that the difference between life and death is but a hairsbreadth but the difference between a live and dead patient is real.

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CASES V AND VI.

OBSTRUCTION OF UNUSUAL AETIOLOGY.

"...Death hath ten thousand several doors  
for men, to take their Exits."

- The Duchess of Malfi.

BARBER, Mrs. Marion  
3, South Seton Park,  
Port Seton,  
East Lothian

Age 71.

Admitted 23.i.46.

Died 30.i.46.

#### HISTORY.

In 1944 this patient had an operation for an intra-abdominal cyst the nature of which she did not know. Since this time she had not felt particularly well and for the three weeks before the 23rd. of January she had suffered much from vague " indigestion ", a sour taste in the mouth and a good deal of regurgitation of whatever she had eaten. In the days immediately before admission she had had knife like trans-abdominal pain, chiefly in the epigastrium and on the last day associated with persistent vomiting.

Over a period of two or three weeks she had noticed a gradual enlargement of her abdomen which had been markedly exacerbated during the last few days. She had been constipated for some time but this had become much worse recently and her bowels had not been opened for a week before her admission.

She had no urinary or chest symptoms.

#### EXAMINATION.

She was an old, rather uncooperative woman, obviously ill and dehydrated and with a sour smell about her breath. There was no evidence of loss of weight.

ABDOMEN. There was marked uniform distension, tense though not tender to palpation and uniformly resonant. There was no guarding of the abdominal muscles

A small hernial knuckle - easily reduced - protruded through one end of a median sub-umbilical incision.

The abdominal viscera were all impalpable and, on auscultation, the peristaltic sounds could not be heard.

RECTAL EXAMINATION. There were a few hard faeces in the rectum but other wise nothing of note.



CARDIO-VASCULAR AND RESPIRATORY SYSTEMS. Her pulse was rapid and stringy. All the heart sounds, though faint were closed. Blood pressure was found to be 75/45 mms. of mercury. There was nothing to note in the examination of the respiratory system.

#### DIAGNOSIS.

This patient presents too vague a pot-pourri of symptoms to warrant any conclusive diagnosis. The gradual enlargement of the abdomen and the increasing constipation appear to indicate constipation though - disregarding the presence of pain - it must be admitted that such a picture could be produced by dyschezia vera. The pain of which she complained was not typical of intestinal colic, suggesting on the other hand an inflammatory lesion - a suggestion not born out by the other clinical features of the case.

Indeed no diagnosis could reasonably be put forward. A tentative opinion of "intestinal obstruction, cause unknown" was adopted it being hoped, either by fresh developments or exploration, that a more satisfactory conclusion could be arrived at later.

The immediate necessity was to improve the patient's general condition by fluid replacement and gastric suction. Accordingly, intra-venous glucose-saline was started in association with gastric suction through a Ryle's tube; at this time her blood pressure had fallen to 78/45 mms. of mercury and in the course of the following hour it fell still more to the region of 68/40. The drip infusion was continued throughout the night and by next morning not only was she subjectively improved but her blood pressure had risen to 110/65 mms. Sedation during the night had been with morphia.

The improvement in the general condition governed the decision taken in the morning to perform a limited, blind decompression working on the assumption that the obstructive lesion was in the large bowel. Her still doubtful condition precluded an extensive laparotomy, the history was suggestive, though not definitely so, of large bowel obstruction and accordingly caecostomy was decided upon.

#### OPERATION.

Mr. A. Ross Lowden.

Local Anaesthesia.

After infiltration of the operation field with local anaesthetic a right gridiron incision was made in the iliac

fossa, the obviously distended caecum presenting on opening the peritoneum. The bowel wall appeared injected and was covered with a thick, glairy, obviously inflammatory exudate. A purse-string catgut suture was inserted into the bowel wall, an incision made within the purse-string and a De Pezzer catheter with the end removed inserted into the lumen. A further purse-string was inserted and the wound closed about the tube after sulphoamide powder had been dusted in.

#### POST-OPERATIVE COURSE.

Her condition after operation was still critical and though the caecostomy worked sporadically from the second day she began to go down hill. There was no zest in her and she lay apathetically awaiting the end. On the 25.1.46 ( the day after operation ) the bacteriology of the exudate was reported as -

Haemolytic streptococcus: penicillin sensitive.  
Bacillus coli: penicillin fast.

Before this report arrived however, she had been started on sulphathiazole by the intravenous route and intramuscular penicillin. These were continued.

In spite of these measures, the continuation of fluid replacement and suction, she continued to deteriorate, became comatose and incontinent and finally died five days after operation. Death appeared to be due mainly to circulatory failure as the blood pressure became unrecordable over the last day.

#### POST-MORTEM REPORT.

PERITONEAL CAVITY. This contained a large quantity of purulent fluid under tension. In addition there were localised collections of pus, notably on the left side of the pelvis, in the vicinity of the caecum and under the right lobe of the liver. The greater omentum was extraordinarily thick and heavy, being studded with cyst like nodules of green, mucinous material. The anterior surface of the omentum was bound to the abdominal wall by green fibrous adhesions. Cyst-like mucinous aggregations were present on the peritoneal surface of the anterior abdominal wall and, in the neighbourhood of the lower end of the median scar, there appeared to be actual infiltration of the abdominal wall itself. The posterior surface of the omentum was similarly bound down to matted coils of

small intestine. Scattered elsewhere throughout the peritoneal cavity there were large and small cyst-like masses of mucinous material. Much of the visceral and parietal peritoneum was covered with green puro-fibrinous exudate and the remainder was congested and dull in appearance.

Microscopic examination of the omentum revealed histological evidence of acute suppurative peritonitis and also of a general infiltration of small round cells suggestive of pre-existing chronic inflammatory stromal reaction. The section included a cyst lined with columnar epithelium and containing mucinous material. In areas there was invasion of the omental tissues by large, pale epithelial cells with irregularly shaped and degenerating nuclei. There were no features suggestive of mitotic activity.

INTESTINE. Both large and small intestines were congested and extensively adherent one to the other. There was slight general distension except in the caecal area at which site also the adhesions were firmer and more organised than elsewhere.

APPENDIX. This was abnormally situated, being attached to the lower end of a cone shaped caecum to which it appeared to form an elongation. The appendix wall was thickened and the lumen was dilated; in the terminal inch there was ulceration of the wall which had, at one point, gone on to perforation. There appeared to be some mucinous thickening of the appendix wall in its terminal part. This mucinous infiltration was confirmed by microscopic examination which showed areas of invasion of the wall by large pale cells of epithelial nature.

OVARIES. The right ovary was normal in appearance for an elderly woman. The left organ was absent and the presence of old firm adhesions in this area suggested that this may have been the site of the cyst removed in 1944.

CARDIO-VASCULAR SYSTEM. The pericardial sac contained an excess of straw coloured fluid. The heart showed a moderate degree of hypertrophy mainly in the left ventricle. There was minimal atheroma of the aorta.

RESPIRATORY SYSTEM. The right pleural cavity contained some clear fluid but the left was largely obliterated by old adhesions. The left lung was considerably fibrosed and showed areas of emphysema. The right lung was voluminous but without fibrosis or emphysema.

CONCLUSION. The microscopic appearances confirm that this case showed a " double pathology " in that a suppurative peritonitis was superimposed on the low grade malignant



condition of pseudomyxoma peritonei. It seems likely that infiltration of the appendix wall was the factor which produced perforation of that organ and so we may consider the pathology as one - the malignant condition giving rise to the perforation, the latter merely adding the last insult to a grossly diseased peritoneal cavity and hastening the fatal result. The clinical picture was thus - by the very nature of the lesions - too complicated to hope that an ante-mortem diagnosis could be made. Indeed it is not so much surprising that she died but that, with such advanced disease, she managed to survive so long.

A brief commentary on this case is included after Case VI.



HAMILTON, MRS. MAGGIE  
1. Young Street,  
Peebles.

Age 67.

Admitted 3.iv.46.  
Died 4.iv.46.

### HISTORY

This patient was having her supper on the evening of the day of her admission when she was suddenly seized with acute mid-abdominal pain. She vomited immediately afterwards and again four times before admission. In addition her bowels moved twice following the onset of her pain. There was no radiation of the pain to her shoulder or back but it rapidly became generalised over the abdomen and remained constant and knife like in intensity.

She stated that she had had medical treatment for peptic ulcer some ten years previously and that she had recently been having injections for anaemia; otherwise she had been in good general health until this sudden onset of abdominal pain which formed her chief and only complaint.

### EXAMINATION.

She was a very pale old woman with a yellowish tinge to her skin, a foul breath and dry coated tongue.

ABDOMEN. There was no movement with respiration. Distension was absent and the outstanding feature was marked generalised rigidity and tenderness, more pronounced over the right lower rectus than elsewhere. Rectal examination showed diffuse tenderness only.

CARDIO-VASCULAR SYSTEM. The pulse was rapid and soft, the blood pressure unrecordable. The heart sounds were faint but closed.

RESPIRATORY SYSTEM. There was nothing to note on examining the lungs.

### DIAGNOSIS.

This old woman presented the signs and symptoms of

acute generalised peritonitis such as are associated with perforation of a hollow viscus. While it is probably unjustifiable to place any great stress on the previous history of peptic ulcer, nevertheless the clinical features suggested perforated ulcer. No heed need be taken of the patient's age or sex in making this tentative diagnosis as perforation, though common in certain age groups and having a pre-dilection for the male, can occur in any one. Indeed, of seven women admitted with perforated peptic ulcer to Ward 14 in the period May 1943 to December 1945, two were over seventy. Similarly, the vomiting occurring after the onset of pain is of more common occurrence than is usually recognised. In my own limited experience I have seen several cases of perforation associated with vomiting, either once or repeatedly.

Though the old lady was extremely ill and in a gravely shocked condition, it was clear that her only hope lay in immediate laparotomy and in an endeavour to suture whatever perforation was encountered. Accordingly, after intravenous plasma had been started and a Ryle's tube passed into the stomach, the abdomen was opened. In an effort to mitigate the shock of operation local anaesthesia with a minimal quantity of pentothal was employed.

#### OPERATION.

Mr. A. Ross Lowden.

Dr. McKinlay - Field  
Block + 1/4 Gr pentothal.

A right paramedian rectus splitting incision revealed a very acute peritonitis and large quantities of partially digested food and faeculent matter in the peritoneal cavity. The stomach and duodenum appeared healthy and the small intestine was followed down to the lower ileum where, in the terminal eight inches of bowel, areas of stenosis were found with one particularly dilated segment proximal to which was a perforation about 1 cm. in diameter discharging bowel content freely. The patient's general condition was very poor and the terminal ileum was therefore exteriorised through a short, oblique muscle cutting incision in the right iliac fossa; the gut was retained by a rod through the mesentery only. The peritoneal cavity was sucked as clean as possible, but contamination was gross. The laparotomy wound was closed by interrupted silk worm gut sutures only. At the end of the operation the patient's condition was very grave.

#### POST-OPERATIVE COURSE.

She failed to rally from the laparotomy and died

shortly afterwards without recovering consciousness.

## POST-MORTEM REPORT.

PERITONEAL CAVITY. Both peritoneal cavity surfaces were bright red from extreme congestion while there was also a considerable quantity of definitely blood-stained serous fluid in which a few small structures resembling raisins were found.

SMALL INTESTINE. A moderately large diverticulum with a thin wall was found  $1\frac{1}{2}$ " distal to the duodenal-jejunal flexure and another small diverticulum was present about two feet distal to the first. The small intestine was slightly distended but other wise normal apart from the terminal ileum which showed the extreme stenosis already described in the operation notes. This stenosis appeared to be due mainly to a thickening of the bowel wall which was extremely friable; on section the gross appearances were those of fibrosis and oedema. Microscopically, there was thickening of the bowel wall with some mucosal fibrosis and marked oedema of the muscle layers. The submucosal lymphoid tissue appeared to be increased but, apart from the region of the perforation, inflammatory infiltration was remarkably slight. To quote from the pathological report ( Mr. Lowden )

" The appearances are those of a chronic non-specific ileitis of regional type but are not characteristic of Crohn's disease."

One further point is worthy of note with regard to the terminal ileum. Firmly impacted in the lumen of the intestine and completely occluding it just distal to the perforation of the wall was found a small piece of brown paper having the characteristics of that used for the wrapping of cakes and other fancy confectionery.

SPLEEN. This organ showed haemorrhages into the pulp.

RESPIRATORY SYSTEM. There was tracheo-bronchial congestion. The pleural surfaces were stippled with numerous small haemorrhages and the cut surfaces showed moderate basal congestion and also many irregular haemorrhages.

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COMMENTARY - CASES V AND VI.



The inclusion of these two cases in the present series rests on their pathological rather than their clinical interest. Little could be done for either of them. In the first, the presence of a slowly progressive diffuse, malignant process rendered death inevitable; the addition of peritonitis from a perforated appendix served but to hasten the end. Undoubtedly a combination of toxæmia and distension produced the result - bringing the case into the class of inflammatory adynamic obstructions. The second is of pathological rather than clinical interest; the ileal obstruction led to abnormal strain on a weakened bowel wall, the abnormal strain to perforation and the escape of highly toxic and infective obstructed bowel content and this in turn to death. It is to be noted that numerous studies have shown that the healthy ileum is probably the most resistant segment of bowel to increased intra-luminal tension and that ileal rupture secondary to obstruction is extremely rare. In the present case we are concerned with the effects of obstruction on a diseased and friable gut wall and the occurrence of perforation is, therefore, not surprising.

In diagnosis this case must be regarded as an exception to the dictum that no abdominal pain is so acute as that caused by the spilling of gastric or duodenal content. Here one was confronted with a patient whose appearances and reactions showed her to be suffering from pain every bit as severe as that of perforated peptic ulcer and the post-mortem appearances revealed an extreme degree of peritoneal irritation. Not only this, but so acute was the hæmorrhage as to produce the rare, but well recognised features of hæmorrhagic toxæmia with acute extra-abdominal extravasations of blood. The mechanism of this phenomenon is obscure but it is an indication of the severity of the toxæmia.

The pathology of this case is also of some interest in that it represents one of a group of poorly defined chronic inflammatory lesions which, in virtue of their stenotic effects, produce a chronic lower ileal obstruction. Usually, however, they come to surgery not primarily as an obstruction but as occasional attacks of a symptom complex suggestive of appendicitis of the mural type. Their slow advancement may result, as in this case, in the gradual adaptation of the body to an increasing degree of terminal ileal obstruction until the proximal intestine contains pints of faeculent material without grave discomfort to the patient. In such circumstances the superimposition of complete obstruction leads to speedy rupture of the bowel wall with the escape of a great amount of highly contaminated and intensely irritant ileal content. In virtue of the pathology of the condition, the prognosis is indeed a gloomy one.

Treatment in the presence of acute peritoneal irritation is standard whether the cause is to be traced to the intestine or elsewhere. Laparotomy in the shortest possible time compatible with preparing the patient for operation is - in spite of the apparent success of conservative regime with perforated peptic ulcer - undoubtedly the best procedure in the vast majority of cases. Even if the individual is in extremis, closure of the perforation combined with a rapid suction toilet of the peritoneal cavity offers some chance of survival. In the present case, however, the nature of the escaping fluid rendered recovery virtually impossible.

These two cases represent what might with truth be termed the "hard core" of mortality from intestinal obstruction, a hard core which even the most refined methods of diagnosis and treatment will not materially influence. Such cases are, in retrospect, mainly of pathological interest though they serve as a reminder that unusual features are of not infrequent occurrence without the realm of the textbook.

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CONCLUSION.

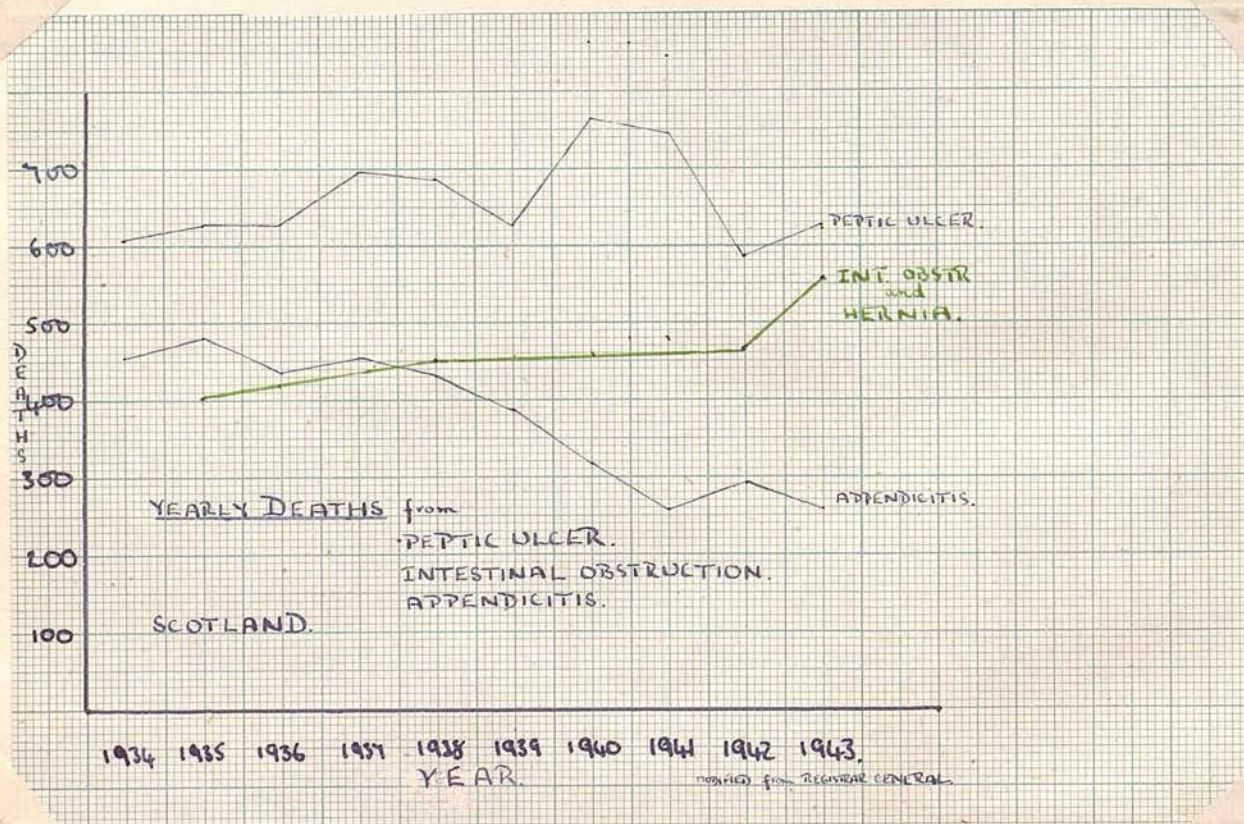
" All that we know is infinitely less than  
all that remains unknown."

- William Harvey.



# SCOTLAND 1943.

|        | PEPTIC<br>ULCER | APPENDIC-<br>ITIS | OBSTRUCTION |
|--------|-----------------|-------------------|-------------|
| DEATHS | 631             | 259.              | 480.        |





Six fatal cases of intestinal obstruction tend perhaps to draw too gloomy a picture of the treatment of bowel occlusion. And yet, as the accompanying figures ( see opposite ) show, intestinal obstruction ranks high as a cause of death when compared with the other two great groups of abdominal emergencies - appendicitis and perforated peptic ulcer. It is not easy to obtain a precise estimate of the mortality in intestinal obstruction because many cases are, no doubt, entered as " hernia " or as " carcinoma of the bowel ". Including, however, three-quarters of the total deaths from hernia as probably resulting from strangulation ( an admittedly rough estimate but a not unlikely one considering the safety of the present day interim operation ) it is clear that deaths from intestinal obstruction - this excluding cases of malignant disease - far exceed those from appendicitis and approach the crude death rate for peptic ulcer. From this latter figure must of course, in attempting to evaluate the success of surgery, be excluded deaths from non-surgical complications and also from interim operations now so frequently carried out. The figure resulting - if indeed we could obtain one - would be marred by artificiality but would provide a better assessment of emergency surgery in relation to the three causes of the " acute abdomen ". For our purposes it would accordingly, be better to regard the figure given for deaths from peptic ulcer as somewhat less than it would appear to be.

Accordingly, intestinal obstruction probably ranks almost as high as peptic ulcer as a cause of death in emergency surgery in Scotland. This is a fact insufficiently emphasised in considerations of the problem and the general practitioner does not display the same sense of urgency with these cases as he does with perforated peptic ulcer or acute appendicitis.

Of further interest is that though deaths from appendicitis have showed a steady decline over the last ten years and, apart from fluctuations during the disturbed conditions of war, those from peptic ulcer have remained fairly steady, a slow increase is apparent in the death rate from intestinal obstruction ( vide graph opposite ). The nature of this increase is difficult to analyse and it is not the purpose of this essay to indulge in fanciful speculations. Better diagnosis and notification probably accounts for some, if not all, of it and increasing age levels in the population for some more. But its exact nature and the factors responsible must await further analysis and better statistical information.

The problem of increasing age in the population is a general one upon which much emphasis has recently been placed. Perhaps some of the talk and insistence on the study of geriatrics has been unbalanced in its enthusiasm but it is undoubtably true that as the population ages we



may expect to encounter more cases of strangulating and malignant obstruction. In spite of the brilliant and frequently recorded successes in the surgery of the aged the vascular state of these patients makes them unsuitable subjects for the major surgery frequently necessary in intestinal obstruction. Unless the advance in surgery parallels the rising age level of the population we can hope for no improvement in the results of treatment in obstruction

The figures of the Registrar General are less cogent argument than the evidence of the Wards. Obstruction bulks large and will continue to do so among the problems of emergency surgery; it is the most complex of the surgical emergencies and, has been emphasised throughout the course of this essay, potentially the most dangerous. It may be not only the primary lesion which results in death but also - in the form of a paralytic ileus - bring to a lethal close the history of a complicated appendicitis or perforated peptic ulcer. It is true to say that no group of cases shows more room for improvement in technique and methods than these. It is with no disrespect to the surgical unit under whose care the foregoing cases came that this essay concludes with Wangansteen's words on the future of the surgery of intestinal obstruction:-

" A better knowledge of the effects of obstruction; a more acute appreciation of the criteria that permit of timely recognition of the presence.....and type of obstruction; and finally a more discerning understanding of the limitations and virtues of the available remedial agents together with with a keener interest in techniques of carrying out therapeutic precepts with precision - these are the important items in the bowel obstruction problem."

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